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CLAIMS:

What is claimed is:

1. A method of oligomerizing olefin, comprising:
5 removing oxygenated hydrocarbon from an olefin stream containing at least one C₂ to C₁₂ olefin to obtain an olefin feed stream comprising less than 1,000 ppm by weight oxygenated hydrocarbon; and
contacting the olefin feed with an acid based oligomerization catalyst to oligomerize the olefin in the olefin feed.
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2. The method of claim 1, wherein the acid based oligomerization catalyst is a solid phosphoric acid catalyst.
3. The method of claim 1, wherein the acid based oligomerization
15 catalyst is a zeolite oligomerization catalyst.
4. The method of claim 3, wherein the zeolite oligomerization catalyst is selected from the group consisting of TON, MTT, MFI, MEL, MTW, EUO, ZSM-57, ferrierites, offretites, ZSM-4, ZSM-18, ZSM-23, Zeolite Beta, faujasites,
20 zeolite L, mordenites, erionites and chabazites.
5. The method of claim 4, wherein the zeolite oligomerization catalyst is ZSM-22, ZSM-23 or ZSM-57.

- 25 6. The method of claim 5, wherein the zeolite oligomerization catalyst is ZSM-22 or ZSM-23.
7. The method in claim 6, wherein the zeolite oligomerization catalyst is a selectivated catalyst.
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8. The method of claim 1, wherein the olefin feed contains less than 50 wt % alkane.

5 9. The method of claim 8, wherein the olefin feed contains at least 50 wt % olefin.

10 10. The method of claim 1, wherein the olefin stream is obtained by contacting oxygenate with a molecular sieve catalyst.

11. The method of claim 10, wherein the oxygenate is methanol or dimethyl ether.

12. The method of claim 1, wherein the olefin feed is hydrated prior to contacting with the acid based oligomerization catalyst.

15 13. The method of claim 12, wherein the hydrated olefin feed has a water content of 0.05 to 2 weight percent.

20 14. The method of claim 1, wherein the olefin feed stream comprises greater than 5 ppm by weight oxygenated hydrocarbon.

15. A method of making an olefin oligomer from an oxygenate, comprising:

25 ~~contacting the oxygenate with a molecular sieve catalyst to form an olefin~~
stream containing at least one C₂ to C₁₂ olefin;

removing oxygenated hydrocarbon from the olefin stream to obtain an olefin feed stream comprising less than 1,000 ppm by weight oxygenated hydrocarbon; and

30 contacting the olefin feed stream with an acid based oligomerization catalyst to form an olefin oligomer.

16. The method of claim 15, wherein the acid based oligomerization catalyst is a solid phosphoric acid catalyst.

17. The method of claim 15, wherein the acid based oligomerization catalyst is a zeolite oligomerization catalyst.

18. The method of claim 17, wherein the zeolite oligomerization catalyst is selected from the group consisting of TON, MTT, MFI, MEL, MTW, EUO, ZSM-57, ferrierites, offretites, ZSM-4, ZSM-18, ZSM-23, Zeolite Beta, faujasites, zeolite L, mordenites, erionites and chabazites.

19. The method of claim 18, wherein the zeolite oligomerization catalyst is ZSM-22, ZSM-23 or ZSM-57.

20. The method of claim 19, wherein the zeolite oligomerization catalyst is ZSM-22 or ZSM-23.

21. The method of claim 20, wherein the zeolite oligomerization catalyst is a selectivated catalyst.

22. The method of claim 15, wherein the olefin feed contains less than 50 wt % alkane.

23. The method of claim 22, wherein the olefin feed contains at least 50 wt % olefin.

24. The method of claim 15, wherein the oxygenate is methanol or dimethyl ether.

25. The method of claim 15, wherein the olefin feed is hydrated prior to contacting with the oligomerization catalyst.

26. The method of claim 25, wherein the hydrated olefin feed has a water content of 0.05 to 2 weight percent.

5 27. The method of claim 15, wherein the olefin feed stream comprises greater than 5 ppm by weight oxygenated hydrocarbon.

28. A method of making an olefin oligomer from an oxygenate, comprising:
10 contacting the oxygenate with a molecular sieve catalyst to form an olefin stream containing at least one C₂ to C₁₂ olefin;
 recovering a C₃ to C₆ olefin stream from the olefin stream,
 removing oxygenated hydrocarbon from the olefin stream to obtain an olefin feed stream comprising less than 1,000 ppm by weight oxygenated
15 hydrocarbon; and
 contacting the olefin feed stream with an acid based oligomerization catalyst to form an olefin oligomer.

29. The method of claim 28, wherein the acid based oligomerization
20 catalyst is a solid phosphoric acid catalyst.

30. The method of claim 28, wherein the acid based oligomerization catalyst is a zeolite oligomerization catalyst.

25 31. The method of claim 30, wherein the zeolite oligomerization catalyst is selected from the group consisting of TON, MTT, MFI, MEL, MTW, EUO, ZSM-57, ferrierites, offretites, ZSM-4, ZSM-18, ZSM-23, Zeolite Beta, faujasites, zeolite L, mordenites, erionites and chabazites.

30 32. The method of claim 31, wherein the zeolite oligomerization catalyst is ZSM-22, ZSM-23 or ZSM-57.

33. The method of claim 32, wherein the zeolite oligomerization catalyst is ZSM-22 or ZSM-23.

5 34. The method of claim 33, wherein the zeolite oligomerization catalyst is selectivated cat.

35. The method of claim 27, wherein the olefin feed contains less than 50 wt % alkane.

10 36. The method of claim 35, wherein the olefin feed contains at least 50 wt % olefin.

37. The method of claim 28, wherein the oxygenate is dimethyl ether.

15 38. The method of claim 28, wherein the olefin feed is hydrated prior to contacting with the oligomerization catalyst.

39. The method of claim 38, wherein the hydrated olefin feed has a water content of 0.05 to 2 weight percent.

20 40. The method of claim 28, wherein the olefin feed stream comprises greater than 5 ppm by weight oxygenated hydrocarbon.

25 41. A method of making an olefin oligomer from an oxygenate, comprising:

 contacting the oxygenate with a molecular sieve catalyst to form an olefin stream containing at least one C₂ to C₁₂ olefin;

 removing oxygenated hydrocarbon from the olefin stream;

30 recovering a C₃ to C₆ olefin stream from the olefin stream, following removal of the oxygenated hydrocarbon, to obtain an olefin feed stream, wherein

the olefin feed stream contains less than 1,000 ppm by weight oxygenated hydrocarbon; and

contacting the olefin feed with an acid based oligomerization catalyst to form an olefin oligomer.

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42. The method of claim 41, wherein the acid based oligomerization catalyst is a solid phosphoric acid catalyst.

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43. The method of claim 41, wherein the acid based oligomerization catalyst is a zeolite oligomerization catalyst.

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44. The method of claim 43, wherein the zeolite oligomerization catalyst is selected from the group consisting of TON, MTT, MFI, MEL, MTW, EUO, ZSM-57, ferrierites, offretites, ZSM-4, ZSM-18, ZSM-23, Zeolite Beta, faujasites, zeolite L, mordenites, erionites and chabazites.

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45. The method of claim 44, wherein the zeolite oligomerization catalyst is ZSM-22, ZSM-23 or ZSM-57.

46. The method of claim 45, wherein the zeolite oligomerization catalyst is ZSM-22 or ZSM-23.

47. The method of claim 46, wherein the zeolite oligomerization catalyst is a selectivated catalyst.

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48. The method of claim 41, wherein the olefin feed contains less than 50 wt % alkane.

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49. The method of claim 48, wherein the olefin feed contains at least 50 wt % olefin.

50. The method of claim 41, wherein the oxygenate is methanol or dimethyl ether.

5 51. The method of claim 41, wherein the olefin feed is hydrated prior to contacting with the oligomerization catalyst.

52. The method of claim 51, wherein the hydrated olefin feed has a water content of 0.05 to 2 weight percent.

10 53. The method of claim 41, wherein the olefin feed stream comprises greater than 5 ppm by weight oxygenated hydrocarbon.

54. A method of oligomerizing olefin, comprising:
providing an olefin feed stream comprising at least one C₂ to C₁₂ olefin
15 and oxygenated hydrocarbon, wherein the oxygenated hydrocarbon is provided in the olefin stream at a concentration of greater than 5 ppm by weight and less than 1,000 ppm by weight; and
contacting the olefin feed with an acid based oligomerization catalyst to oligomerize the olefin in the olefin feed.

20 55. The method of claim 54, wherein the acid based oligomerization catalyst is solid phosphoric acid catalyst.

25 56. The method of claim 54, wherein the acid based oligomerization catalyst is a zeolite oligomerization catalyst.

57. The method of claim 56, wherein the zeolite oligomerization catalyst is selected from the group consisting of TON, MTT, MFI, MEL, MTW, EUO, ZSM-57, ferrierites, offretites, ZSM-4, ZSM-18, ZSM-23, Zeolite Beta, faujasites, zeolite L, mordenites, erionites and chabazites.
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58. The method of claim 57, wherein the zeolite oligomerization catalyst is ZSM-22, ZSM-23 or ZSM-57.

5 59. The method of claim 58, wherein the zeolite oligomerization catalyst is ZSM-22 or ZSM-23.

60. The method of claim 59, wherein the zeolite oligomerization catalyst is a selectivated catalyst.

10 61. The method of claim 54, wherein the olefin feed contains less than 50 wt % alkane.

62. The method of claim 61, wherein the olefin feed contains at least 50 wt % olefin.

15 63. The method of claim 54, wherein the olefin stream is obtained by contacting oxygenate with a molecular sieve catalyst.

20 64. The method of claim 63, wherein the oxygenate is methanol or dimethyl ether.

65. The method of claim 54, wherein the olefin feed is hydrated prior to contacting with the oligomerization catalyst.

25 66. The method of claim 65, wherein the hydrated olefin feed has a water content of 0.05 to 2 weight percent.